



Green Schools Network

ACTIVITY SHEET

January 2013

Why talk about RADIATION?



We have all grown up using appliances like cellphones, microwave ovens, television sets and computer screens. Our parents have been using them too, so they must be pretty harmless, right? WRONG! The fact is that all these appliances emit some radiation. We are exposed to radiation at home, work and most other places we go. We are bombarded with radiation from a wide range of sources. They are so integrated in our everyday life that reducing it would mean making major changes in our daily life.

So why should we make the effort? Because, everyone who is exposed to radiation bears an increased health risk. Biological effects have been observed at frequencies much lower than a typical urban dweller's average exposure level. Radiation exposure may cause headaches, sleep disorders, poor memory, confusion, anxiety, irritability, behavioural changes, appetite disturbances, nausea, dizziness, depression, chronic fatigue, localised heating culminating in boils, skin tumours and hearing troubles. Apart from affecting the adult reproductive system, radiation in the long term can even foster cancer.

Note: The evidence available does not provide a clear pattern to support an association between radiation exposure and direct effects on health, however, it does not rule out adverse effects on health completely. These studies are not definitive. Much more research is needed.



Name.....
 School Name

Class..... Date

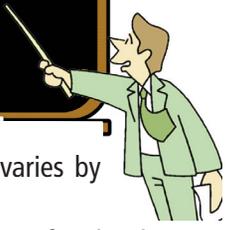
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Cellphones: All cellphones emit radiation (electromagnetic energy). Many cellphone users spend atleast 30 minutes a day on their mobile. That is 11,000 minutes a year of cellphone radiation applied to the side of their head. Year after year after year. All this high frequency energy damages health depending on how the mobile is being used and for what period of time.

Radiation exposure is measured by a unit called '**Specific Absorption Rate**' or **SAR**. SAR is the amount of radiation that is absorbed into the body over a given time and has the unit, Watts per kilogram (W/Kg). For mobile phones, SAR varies by handset model, distance from the base station, etc.

To regulate radiation, the Department of Telecommunications (DoT), Government of India, has stipulated the SAR limit as **1.6 W/Kg**. For more on the DoT policy mentioning the same log on to www.dot.gov.in

Radiation is energy that comes from a source and travels through some material or through space. All electrical appliances and electronic devices emit different levels of radiation. While we cannot escape exposure to some radiation, we must control and reduce our exposure to radiation.



Activity 1: Exposure to SAR: Make a list of all your family members and the mobile phone models that they use. Extend the list to some of your neighbours. Find out the SAR levels of the different models of mobile phones from the mobile phone manufacturer's website. Alternatively, you can find the SAR values for different models of different brands by searching the required model on this link:

<http://sarshield.com/radiation-chart/>

Advise any one you know who might be using a mobile phone handset having SAR greater than 1.6 W/kg to switch to another model having SAR less than or equal to 1.6 W/Kg.

Family Member	Mobile Phone Model Being Used	SAR Level of the Model	Within Acceptable Limit or not If SAR<1.6, then YES; else NO
Father			
Mother			
Sibling			

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Cellular Towers: Cell towers are the base stations which control cellphone communication. Despite the fact that radiation from cellular devices has been proved to be dangerous, telecom providers continue to install more and more towers. People living within 50 to 300 metre radius of these towers, are in the high radiation risk zone.

Activity 2: Take a walk around the neighbourhood of your school/ house. Find out how many cellphone towers there are and whether they follow some of the basic guidelines stated by DoT that are given below. As per your observation, mention Yes/No against each.

Observation to be Made	Answer (Yes/No)
Q.1. Are there any antennae within 3 metres from any building?	
Q.2. Are there any antennae facing any building?	
Q.3. Are there any towers in narrow lanes (lanes with width less than 5 metres)?	
Q.4. Are there any towers within the premises of schools/ hospitals?	
Q.5. Are there any towers within a radius of 100m from a residential building, school or hospital?	
Q.6. Are tower sites cordoned off with wire fencing etc?	
Q.7. Do the tower sites have sign boards/ warning signs which are clearly visible and identifiable?	



Are the radio frequency waves emitted from cellphone towers damaging our health? Being exposed to a mobile tower located within 50 metres is like being in a microwave oven for 24 hours, say experts.

If any of the answers to Q.1 to Q.5 is 'Yes' and/or answers to Q.6 and/or Q.7 is 'No', the matter must be taken up with the concerned authority such as the RWA (Resident Welfare Association) or school / hospital management. Request a parent or a teacher to come with you for the same.

Ways to Reduce Exposure to Radiation from a Cellphone



1 When carrying a cellphone, keep it as far away from you as possible. Handbags and briefcases are better than pockets, but do not rest them on your lap. If working at a desk, take your phone out of your pocket and place it on the desk (not too close). For every inch that the phone is held away from your body, the radiation drops by a factor of two.



2 Use the headset/earphones or bluetooth earpiece whenever possible as these emit radiations of much less magnitude. Better still, use the loudspeaker on your phone whenever possible. For long use of bluetooth earpiece, switch it from ear to ear to reduce radiation exposure on one side.



3 Keep cellphone conversations short. If you can not avoid a long conversation, switch ears every two or three minutes.

4 Use the landline whenever possible or send text messages instead of calling.



5 Avoid using your phone when the signal strength is weak. Using a cellphone in an enclosed space (car/basement) causes the phone to beef up its signal strength to maintain contact with the tower. Cellphone radiation bounces around inside a vehicle, increasing your exposure and that of any other passengers. If possible, switch off your cellphone when inside a vehicle.



6 Do not sleep with an active phone next to the bedside or under the pillow. Keep it switched off or away from the bed.

7 Children have smaller and thinner skulls making them more vulnerable than adults. So their access to cellphones should be limited.

Children and teenagers are five times more likely to get brain cancer if they use cellphones. Children can accumulate higher levels of radiation than older people as they have entered the world at a time when electromagnetic pollution levels are much higher than that experienced by their parents.

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Toxic Radiation Generated at Home/ School/ Work: As mentioned earlier, all electrical appliances and electronic devices emit radiations of varying intensity. In general, the intensity of radiation from electronic devices is lower than that from electrical appliances. However, regular exposure to even low level radiation can be dangerous. But that does not mean that we are all doomed. It means that we need to understand and manage our risk. Let us take a look at how some of these conveniences affect us and some measures that can be adopted to reduce the radiation we are absorbing.



Flat panel Televisions (TVs) and computer monitors are electronic appliances that emit far less radiation than the old box shaped computer monitors/ TV sets. Sitting atleast 6 feet away from the TV and limiting duration of exposure to TV and computer screens should help reduce radiation exposure.



Laptop computer radiation is generally lower than that from desktop PCs. But the problem with laptop radiation is that you may be very close to it, especially if you operate the laptop on your lap! Position the laptop on a table while using it. Using a separate keyboard and mouse (not wireless!) would also be a good idea.



Printers and photocopiers produce almost twice the amount of radiation while working than when they are on stand-by mode. All such computer appliances should be positioned at a safe distance (atleast 1.5 metres) from where people work.



Wi-fi networks and other wireless devices all emit radiations that interfere with biological processes. Some schools installing Wi-Fi networks in the computer centre and classrooms is a matter of concern. Children are biologically more vulnerable to radiation, hence, schools and libraries should always install wired networks. It is safer to use wired products for your home too.



Microwave ovens, refrigerators, vacuum cleaners, washing machines, electric heaters, woofers, hair dryers, and other such appliances, can all produce substantial amounts of radiation. Taking one step away from an appliance reduces the intensity of radiation by one half or more. Minimising the duration of use, and turning off appliances when not in use, are other combative measures to reduce exposure to radiation.



For the sake of health and as a precautionary measure, it would be wise to limit exposure to any source of radiation – either by increasing one's distance from it (as intensity of radiation varies inversely with distance) and/or limiting the duration of use.

Activity 3: List out all the electrical and electronic appliances in your house. Against each equipment, write down whether it is in the electrical or electronic category. Also mention the different ways by which you can reduce the intensity of radiation you and your family are exposed to. One has been given as an example.

S. No.	Appliance	Electrical / Electronic	How to Decrease Exposure to Radiation
1.	Television	Electronic	Reduce the number of hours spent watching TV, ensure that the TV set at home is atleast 6 feet away, switch to a flat-panel TV from the box-shaped TV if possible.

Discuss with your parents how you can rearrange some of the appliances at home in order to reduce the amount of radiation you are exposed to. Next, with your parents' approval and assistance make the necessary changes in your house.



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